PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
OGILVY RENAULT
1600 - 1981 McGill College Avenue
MONTREAL, Quebec
Canada, H3A 2Y3

4/4

REC'D 26 MAY 2005
WIPO PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year)

16 May 2005 (16-05-2005)

Applicant's or agent's file reference 8426-1862PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No. PCT/CA2005/000083

International filing date (day/month/year) 25 January 2005 (25-01-2005)

Priority date (day/month/year)
27 January 2004 (27-01-2004)

International Patent Classification (IPC) or both national classification and IPC IPC 7 C07C 317/46

Applicant

MERCK FROSST CANADA & CO. ET AL

1. This opinion contains indications relating to the following items:

[X] Box No. I

Basis of the opinion

[X] Box No. II

Priority

[X] Box No. III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

[] Box No. IV

Lack of unity of invention

[X] Box No. V

Reasoned statement under Rule 43bls. 1(a)(1) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

Box No. VI

Certain documents cited

[X] Box No. VII

Certain defects in the international application

[X] Box No. VIII

Certain observations on the international application

2 FUDTHED ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9

Authorized officer

May Ling Nung (819) 997-2939

Facsimile No: 001(819)953-2476

Form PCT/ISA/237 (cover sheet) (January 2004)

Page 1 of 8

В	ox No. I Basis of this opinion	1				,
1.	With regard to the language, this of which it was filed, unless otherwise	pinion has been established indicated under this item.	d on the basis of the in	nternational a	pplication in th	e language
	[] This opinion has been established	ed on the basis of a transl	ation from the original	l language in	to the following	language
	, which is the la	nguage of a translation fu				
	(under Rules 12.3 and 23.1(b)).			•		
2.	With regard to any nucleotide and/claimed invention, this opinion has b	or amino acid sequence opeen established on the ba	disclosed in the internasis of:	ational applic	cation and neces	ssary to the
	a. type of material					
	[] a sequence listing					•
	[] table(s) related to the sequ	ence listing				
	b. format of material					
	[] in written format					
	[] in computer readable form	ı			•	
	c. time of filing/furnishing					
	[] contained in the internation	nal application as filed.	. •			
	[] filed together with the inte	mational application in c	omputer readable forn	n.		
	[] furnished subsequently to	this Authority for the pur	poses of search.			•
3.	[] In addition, in the case that more the furnished, the required statement the filed or does not go beyond the app	at the information in the sub	sequent or additional co	able relating the pies is identicated	nereto has been fi al to that in the ap	led or oplication as
4.	Additional comments:			•		•
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Box No.	II Priority	· ·			
			• .		-
1. []	The following document has not y	et been furnished:			
	[] copy of the earlier application	on whose priority has been cla	nimed (Rules	43bis.1 and 66.7(a)).	
	[] translation of the earlier app	lication whose priority has be	en claimed (l	Rules 43bis.1 and 66.7(b)).	
	Consequently it has not been poss on the assumption that the relevan			claim. This opinion has neverthe	eless been established
2. []	This opinion has been established (Rules 43bis.1 and 64.1). Thus for relevant date.				
3. Addi	itional observations, if necessary	· · · · · · · · · · · · · · · · · · ·	•		
	It has not yet been possil does not have in its poss claimed. This opinion hat the claimed priority date	ession a copy of the east nevertheless been es	arlier appl	ication on which priority	has been
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Box No. II	П Non-establishment	of opinion with regard to novelty, inventive step and industrial applic	ability
The question industrially	ions whether the claimed inve y applicable have not been ex	ention appears to be novel to involve an inventive step (to be non-obvious), or to be
[] tb	he entire international applica	ation	
[X] cl	laim Nos. 6-17		
because	ð:		
	ne said international applicati	on, or the said claim Nos. 6-17 tter which does not require an international preliminary examination (specify):	
A	Although claims 6-17 are d	irected to methods of treatment of the human/animal body, the sear e alleged effects of the compound/composition.	rch has been
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	,		
		·	
		s (indicate particular elements below) or said claim Nos.	
		opinion could be formed (specify):	
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•			
	·		
[] the	e claims, or said claim Nos.		•
	·	are so inadequately su surgful opinion could be formed.	pported
	•	as been established for said claim Nos.	•
[] the		id sequence listing does not comply with the standard provided for in Ann	ex C of the
the	e written form	[] has not been furnished	
		[] does not comply with the standard	
the	e computer readable form	[] has not been furnished	
		[] does not comply with the standard	
[] the	tables related to the nucleoti	ide and/or amino acid sequence listing, if in computer readable form only, rements provided for in Annex C-bis of the Administrative Instructions.	do not
1 1 200	e Sunniamental Pay for furth	ou dataila	

International application No. PCT/CA2005/000083

			•	 •
. Statement				
Novelty (N)	Claims	1-19		 _ YES
•	Claims			 NO
Inventive step (IS)	Claims			 YES
	Claims	1-19		 NO
Industrial applicability (IA)	Claims	1-5, 18, 19		 YES
	Claims			 NO

2. Citations and explanations:

Reference is made to the following document:

D1 WO 01/45703

D2 WO 03/103602

The present application refers to compounds of the general formula (I), a method of treating an inflammatory disease susceptible to treatment with a non-steroidal anti-inflammatory agent, a method of treating cyclooxygenase mediated diseases advantageously treated by an active agent that selectively inhibits COX-2 in preference to COX-1. Furthermore, independent claims 18 and 19 refer to pharmaceutical compositions comprising a compound of claim 1, aspirin and a carrier, and a compound of claim 1 and a carrier, respectively.

1. Novelty

Box No. V

None of the available prior art documents disclose compounds falling within the scope of the present product claims, pharmaceutical compositions containing them and their uses. Consequently, claims 1-19 are considered to meet the requirement of Art. 33(2) PCT.

2. Inventive Step

D1 discloses nitrosated and nitrosylated COX-2 inhibitors represented by the formula (III), wherein R¹ is SO₂CH₃ or SO₂NH₂, R² is a mono-, di- or tri- substituted phenyl, Y³ is CH₂OC(O)R⁶, wherein R⁶ is OR⁸, wherein R⁸ is K, wherein K is a linear alkyl with terminal -ONO₂ or NO₂ group, X³ is C(O)-U-D¹, wherein U is oxygen and D¹ is H, or X³ is C(O)OH (see page 4, line 26 to page 5, line 8 and lines 23-29; page 45, line 10 to page 47, line 22; page 91, line 27 to page 92, line 3, page 93, lines 15-19 and lines 29-31, and examples 12 and 14).

D2 discloses a nitrosated and/or nitrosylated cyclooxygenase 2 selective inhibitor represented by the formula (V) which has two nitrate groups, composition containing the same and methods of treating inflammatory diseases (see page 19, the formula (V) and page 31, lines 17 and 32-36, claim 3).

The documents D1 and D2 are regarded as representing the closest prior art which describes novel nitrosated and nitrosylated cyclooxygenase-2 (COX-2) inhibitors and compositions containing them and their uses.

Continued in Supplemental Box

International application No. PCT/CA2005/000083

Box N

VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

In claim 1, at line 27, the word "with" is repeated (Article 6 PCT).

In claims 6 and 8, at lines 21 and 30, the word "of" after "treatment" is redundant (Article 6 PCT).

International application No. PCT/CA2005/000083

Box No

VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in WO 97/28120 and WO 03/103602 are not mentioned in the description, nor are these documents identified therein.

In claims 14 to 16, the use of the term "about" causes ambiguity. This term has no limiting effect when used in connection with ranges and leads to a lack of clarity as to the scope of said claims (Article 6).

International application No. PCT/CA2005/000083

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

According to the application (see especially page 2, third paragraph of the description) the problem underlying the invention is the provision of novel nitrosated compounds for cyclooxygenase-2 selective inhibitors.

To solve the problem the applicant provides the compounds of the general formula I of the present application, which differ from the compounds of D1 in having two NO-donor group instead of one NO-donor groups. Since it is known from D1 and D2 that COX-2 inhibitor can be substituted with more than one NO and/or NO₂ group, the person skilled in the art would have been added one more NO-donor group in order to provide alternative compounds with the same activity and improved gastrointestinal and cardiovascular safety profiles and use said compounds as anti-inflammatory agents. Furthermore, the use of COX-2 inhibitors in conjunction with other therapeutic agents such as aspirin for co-therapies is taught in both D1 and D2.

Claims 1-19 are therefore considered as not meeting the requirement of Art. 33(3) PCT.

3. Industry Applicability

On the basis of the uses provided in the description, claims 1-5, 18 and 19 are therefore considered as meeting the requirement of Article 33(4) PCT.

The subject matter of claims 6-17 is directed to a method of medical treatment of the human or animal body (Rule 39.1(iv)PCT). No unified criteria exist in the PCT Contracting States for the assessment of the industrial applicability of claims 6-17 (Article 33(4)PCT).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

OGILVY RENAULT 1600 - 1981 McGill College Avenue MONTREAL, Quebec Canada, H3A 2Y3

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PCT WIPO PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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Box No. IV

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Reasoned statement under Rule 43bis. 1(a)(1) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

Box No. VI

Certain documents cited

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Certain observations on the international application

2. FURTHER ACTION

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For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage I, C114 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec KIA 0C9

Authorized officer

May Ling Nung (819) 997-2939

Facsimile No: 001(819)953-2476

Form PCT/ISA/237 (cover sheet) (January 2004)

Page 1 of 8

В	ox No. I	Basis of this opinion	
1.	With regard which it was	d to the language, this opinion has been established as filed, unless otherwise indicated under this item.	on the basis of the international application in the language
		· ·	tion from the original language into the following language mished for the purposes of international search
2.	With regard claimed inve	d to any nucleotide and/or amino acid sequence d vention, this opinion has been established on the bas	lisclosed in the international application and necessary to the sis of:
	a. type of n	material	
	[] as	sequence listing	
	[] tal	able(s) related to the sequence listing	
	b. format of	of material	
	[] in	n written format	
	[] in	n computer readable form	
	c. time of fi	filing/furnishing	
	[] co	ontained in the international application as filed.	
	[] fil	iled together with the international application in co	mputer readable form.
	[] fu	urnished subsequently to this Authority for the purp	oses of search.
3.	furnished		equence listing and/or table relating thereto has been filed or equent or additional copies is identical to that in the application as te, were furnished.
4.	Additional co	comments:	
	•	•	
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Box No.	l Priority
1. []	The following document has not yet been furnished:
	[] copy of the earlier application whose priority has been claimed (Rules 43bis.1 and 66.7(a)).
	[] translation of the earlier application whose priority has been claimed (Rules 43bis.1 and 66.7(b)).
	Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
2. []	This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Addit	onal observations, if necessary:
	It has not yet been possible to consider the validity of the priority claim because the Authority does not have in its possession a copy of the earlier application on which priority has been claimed. This opinion has nevertheless been established on the assumption that the relevant date the claimed priority date.
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Box No. III Non-esta	blishment of opinion with regard to novelty, inventive step and industrial applicability
The questions whether the	claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be enot been examined in respect of:
[] the entire internat	onal application
[X] claim Nos. <u>6-17</u>	
because:	
	nal application, or the said claim Nos. 6-17 ng subject matter which does not require an international preliminary examination (specify):
Although claims carried out and b	6-17 are directed to methods of treatment of the human/animal body, the search has been based on the alleged effects of the compound/composition.
· .	
	ns or drawings (indicate particular elements below) or said claim Nos. o meaningful opinion could be formed (specify):
[] the claims, or said	claim Nos are so inadequately supported
•	that no meaningful opinion could be formed.
[] no international se	arch report has been established for said claim Nos.
[] the nucleotide and Administrative Ins	or amino acid sequence listing does not comply with the standard provided for in Annex C of the tructions in that:
the written form	[] has not been furnished
	[] does not comply with the standard
the computer reads	able form [] has not been furnished
· ·	[] does not comply with the standard
[] the tables related to	the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not

International application No. PCT/CA2005/000083

Box No. V Reasoned statement under Rule 43bis.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement 1. Statement Novelty (N) Claims 1-19 YES Claims NO Inventive step (IS) Claims Claims NO Industrial applicability (IA) Claims 1-5, 18, 19 Claims NO

2. Citations and explanations:

Reference is made to the following document:

D1 WO 01/45703

D2 WO 03/103602

The present application refers to compounds of the general formula (I), a method of treating an inflammatory disease susceptible to treatment with a non-steroidal anti-inflammatory agent, a method of treating cyclooxygenase mediated diseases advantageously treated by an active agent that selectively inhibits COX-2 in preference to COX-1. Furthermore, independent claims 18 and 19 refer to pharmaceutical compositions comprising a compound of claim 1, aspirin and a carrier, and a compound of claim 1 and a carrier, respectively.

1. Novelty

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Continued in Supplemental Box

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Box No. VII

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International application No. PCT/CA2005/000083

Box No

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In claims 14 to 16, the use of the term "about" causes ambiguity. This term has no limiting effect when used in connection with ranges and leads to a lack of clarity as to the scope of said claims (Article 6).

International application No. PCT/CA2005/000083

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In case the space in any of the preceding boxes is not sufficient.

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To solve the problem the applicant provides the compounds of the general formula I of the present application, which differ from the compounds of D1 in having two NO-donor group instead of one NO-donor groups. Since it is known from D1 and D2 that COX-2 inhibitor can be substituted with more than one NO and/or NO₂ group, the person skilled in the art would have been added one more NO-donor group in order to provide alternative compounds with the same activity and improved gastrointestinal and cardiovascular safety profiles and use said compounds as anti-inflammatory agents. Furthermore, the use of COX-2 inhibitors in conjunction with other therapeutic agents such as aspirin for co-therapies is taught in both D1 and D2.

Claims 1-19 are therefore considered as not meeting the requirement of Art. 33(3) PCT.

3. Industry Applicability

On the basis of the uses provided in the description, claims 1-5, 18 and 19 are therefore considered as meeting the requirement of Article 33(4) PCT.

The subject matter of claims 6-17 is directed to a method of medical treatment of the human or animal body (Rule 39.1(iv)PCT). No unified criteria exist in the PCT Contracting States for the assessment of the industrial applicability of claims 6-17 (Article 33(4)PCT).